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Jayarambhatia rhizophorae gen. et sp. nov., an asexually reproducing fungus from Goa, India

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Abstract — A new hyphomycete genus, *Jayarambhatia,* is proposed, characterized by mononematous branched septate pale brown smooth conidiophores with terminal hyaline phialidic conidiogenous cells with long slender necks and minute collarettes. Numerous smooth aseptate narrowly obclavate filiform conidia double over and pack densely together to form ovate mucous heads on the tips of the conidiogenous cells. The type species was collected from decomposing litter of *Rhizophora mucronata* in an intertidal mangrove area in Goa, India.

Key words — systematics, taxonomy

Introduction

Unique organisms inhabit mangroves in the intertidal saline zones. This highly productive ecosystem supports many marine organisms including fish (Thatoi & Biswal 2008). Fungi inhabiting this ecosystem are called manglicolous fungi, and they degrade mangrove litter and other detritus (Nambiar & Raveendran 2009). The entire coast of Goa with its backwaters and seven major rivers is lined with diverse mangrove vegetation.

During a survey of manglicolous fungi of Goa, a unique asexually reproducing fungus was encountered on decomposing twigs and a viviparous seedling of *Rhizophora mucronata* Lam. (*Rhizophoraceae*). The fungus produced mononematous branched septate pale brown smooth conidiophores terminating in phialidic conidiogenous cells with long slender necks and smooth filiform conidia that double over and pack closely together to form mucous heads at the tips of the conidiogenous cells. These unique features warrant accommodation of the fungus in a new genus. The monotypic genus is compared with four closely related genera (*Atrosetaphiale, Kmetiopsis, Natarajania, Phaeohiratsukaea*) and *Dictyochaeta lilliputiana, D. minutissima,* and *D. uncinata,* and its sole species is described and illustrated.

Materials & methods

Freshly gathered mangrove litter from intertidal area was brought to the laboratory in polythene bags, incubated for 2–3 days and examined under a stereomicroscope. The fungus was carefully picked up with a sterile needle and mounted in either lactophenol or lactophenol cotton blue mountant. The slides were observed under a light microscope. The holotype is conserved in the herbarium of the Indian Agricultural Research Institute, New Delhi, India (HCIO).

Taxonomy

Jayarambhatia Pratibha, **gen. nov.**

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Differs from *Atrosetaphiale, Kmetiopsis, Natarajania, Phaeohiratsukaea,* and *Dictyochaeta* by solitary branched conidiophores lacking setae, terminal monophialidic conidiogenous cells with elongated slender necks terminating in minute collarettes with filiform conidia that are doubled over and packed closely together in mucous heads.

Type species: *Jayarambhatia rhizophorae* Pratibha

Etymology: In honor of Prof. D. Jayarama Bhat, Department of Botany, Goa University, Goa, India.

Colonies effuse, white, velvety. Mycelium partly immersed in the substrate. Conidiophores mononematous, macronematous, erect, straight, solitary, sometimes branched, smooth, brown. Conidiogenous cells monophialidic, terminal, integrated, cylindrical, terminating with a narrow, elongated, slender neck. Conidial head ovate, mucous, within which numerous conidia are doubled over and densely packed. Conidia smooth, hyaline, aseptate, filiform, narrowly obclavate, straight to flexuous when mounted in water.

Jayarambhatia rhizophorae Pratibha, **sp. nov.** Figs 1, 2

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Differs from species of *Atrosetaphiale, Kmetiopsis, Natarajania, Phaeohiratsukaea*, and *Dictyochaeta* by monophialidic terminal conidiogenous cells with elongated slender necks terminating with a minute collarette, and filiform conidia irregularly doubled over within a mucous head.

Type: India, Goa, Chorao, on decomposing litter of *Rhizophora mucronata*, 8 January 2013, coll. J. Pratibha (**Holotype,** HCIO 51502).

Etymology: Referring to the host genus.

Colonies effuse, white, velvety. Mycelium light brown, smooth, septate, 2–3 µm wide, partly immersed in the substrate. Conidiophores mononematous, macronematous, erect, straight to flexuous, solitary, septate, rarely branched at the base, smooth, pale brown, 75–150 × 4.5–7 µm. Conidiogenous cells monophialidic, terminal, integrated, cylindrical, smooth, 15–20 × 5–6 µm, with an elongated, narrow, slender neck terminating in a small collarette. Conidial head ovate, mucous, 15–20 µm long, within which numerous conidia are

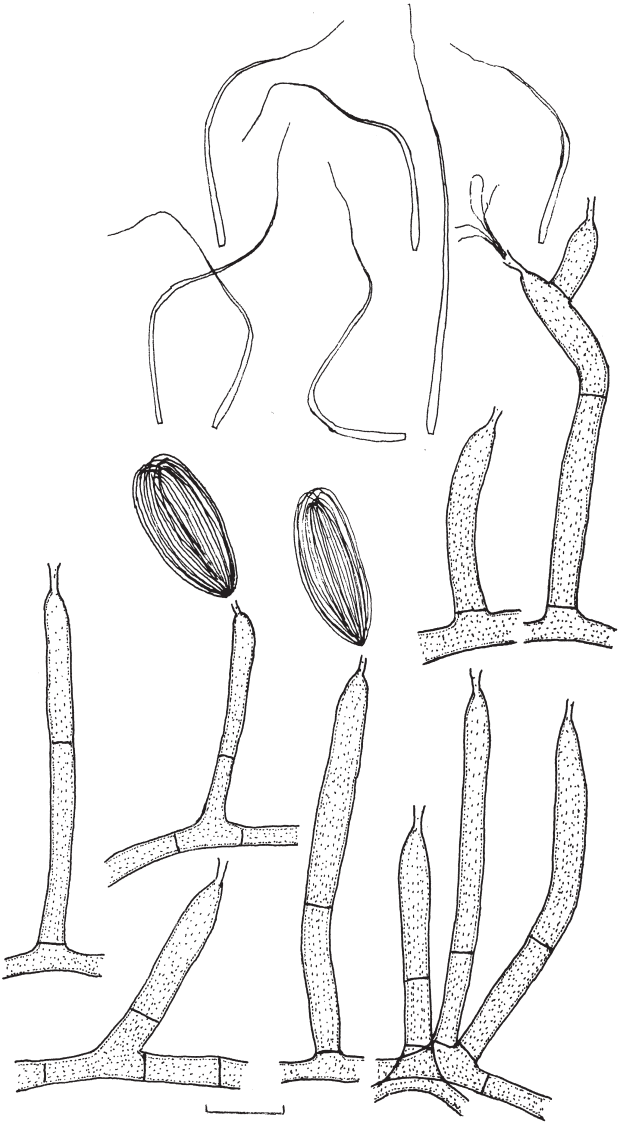

Fig.1. *Jayarambhatia rhizophorae* (holotype, HCIO 51502): Conidiophores, conidiogenous cells, and conidia. Scale bars = 10 µm.

doubled over and densely packed. Conidia smooth, hyaline, aseptate, filiform, narrowly obclavate, straight to flexuous, 30–50 × 1 µm when mounted in water.

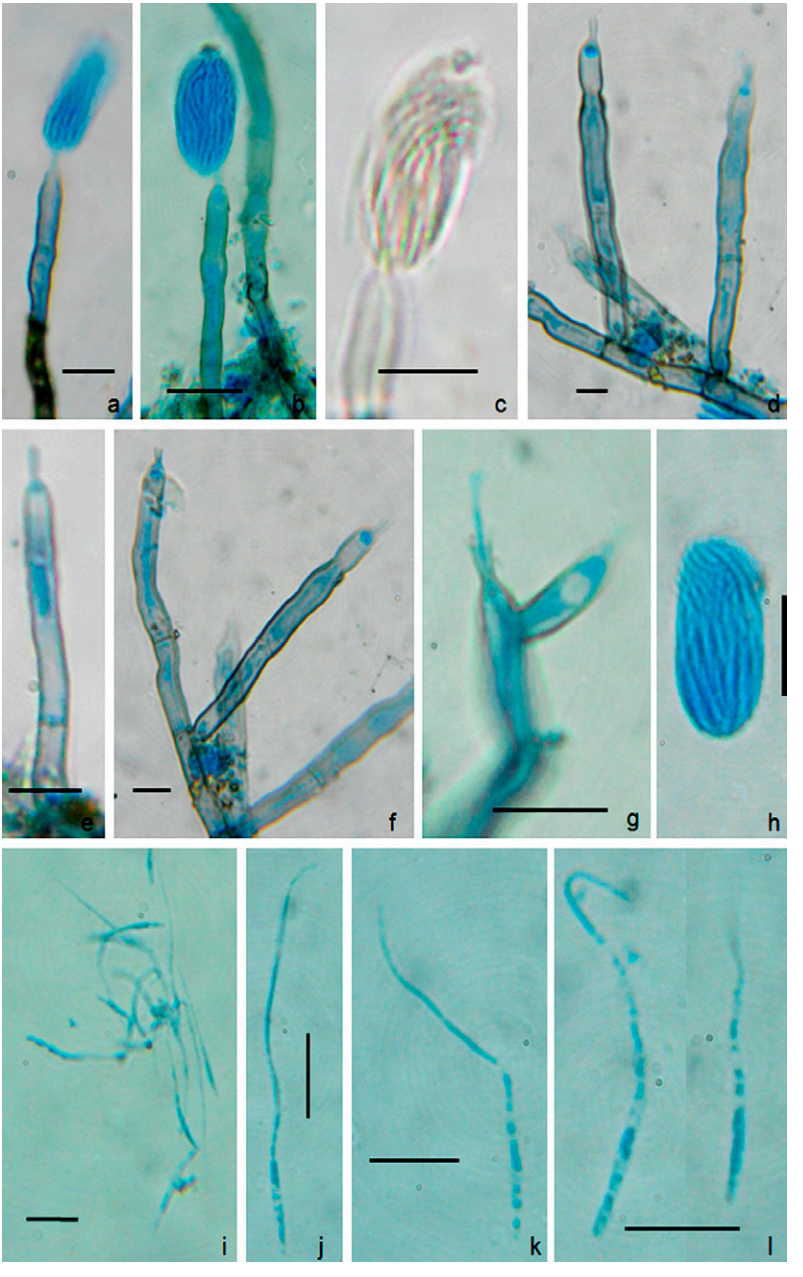

Fig. 2. *Jayarambhatia rhizophorae* (holotype, HCIO 51502): a–f. Conidiophores; g. Conidiogenous cells; h. Mucous conidial head; i–l. Conidia. Scale bars = 10 µm

Discussion

Jayarambhatia is morphologically similar to anamorphic genera such as *Atrosetaphiale* Matsush., *Kmetiopsis* Bat. & Peres, *Natarajania* Pratibha & Bhat, *Phaeohiratsukaea* Udagawa & Iwatsu, and three species of *Dictyochaeta* — *D. lilliputiana* R.F. Castañeda, *D. minutissima* A. Hern.-Gut. & J. Mena, and *D. uncinata* R.F. Castañeda & W.B. Kendr. (Table 1). *Atrosetaphiale, Kmetiopsis,* and the three *Dictyochaeta* spp. are similar to *Jayarambhatia* in producing a mucous head of filiform or acerose conidia on monophialidic conidiogenous cells (Batista & Peres 1960, Hernandez-Gutiérrez & Mena Portales 1996, Batista & Peres 1960, Castañeda 1986, Castañeda et al. 1998, Matsushima 1995). *Natarajania* and *Phaeohiratsukaea* produce phialidic conidiogenous cells with an elongated, slender neck with a collarette (Pratibha & Bhat 2005, Udagawa & Iwatsu 1990). None of these fungi have filiform conidia doubled over within mucous heads. *Atrosetaphiale* produces discrete, ampuliform, numerous conidiogenous cells. In *Dictyochaeta lilliputiana* conidiophores are ampulliform and conidiogenous cells are without neck and conspicuous

Table 1. Comparison between *Jayarambhatia* and related genera and species

Genera	Habitat	Conidiophores	Conidiogenous cells	Conidia
Atrosetaphiale	Terrestrial litter	Mononematous, solitary, unbranched	Monophialidic, discrete, numerous, ampuliform	Filiform, slimy, long, flexuous, hyaline
Dictyochaeta lilliputiana	Terrestrial litter	Mononematous, solitary, unbranched, aseptate, ampuliform	Monophialidic, without neck and conspicuous collarette	Filiform, slimy, curved, hyaline
Dictyochaeta minutissima	Terrestrial litter	Mononematous, solitary, branched	Monophialidic, with 1–3 percurrent proliferations	Acerose to fusiform, slightly curved, hyaline to sub-hyaline
Dictyochaeta uncinata	Terrestrial litter	Mononematous, solitary, unbranched, setose.	Monophialidic with conspicuous narrow collarette	Filiform, slimy, long, flexuous, hyaline
Kmetiopsis	Terrestrial litter	Sporodochial with pseudostroma	Monophialidic, without neck and collarette	Solitary, slimy, falcate, hyaline, ends pointed
Natarajania	Terrestrial litter	Mononematous, fasciculate, verrucose towards apex	Monophialidic, with long, cylindrical neck and collarette	Solitary, slimy, ellipsoidal, dark brown
Phaeohiratsukaea	Terrestrial litter	Mononematous, fasciculate, branched	Mono- to polyphialidic, with short neck and collarette	Catenate, dry, ellipsoidal, brown with germ slit
Jayarambhatia	Mangrove litter	Mononematous, solitary, branched	Monophialidic with slender neck and minute collarette	Filiform, slimy, long, flexuous, hyaline, tightly doubled over, forming mucous head

collarette. *Dictyochaeta minutissima* produces monophialidic conidiogenous cells with 1–3 percurrent proliferations and acerose to fusiform conidia. In *Dictyochaeta uncinata* conidiophores are unbranched, it produces setae, and the conidiogenous cells have a conspicuous narrow collarette. In *Kmetiopsis* the conidiophores are sporodochial with a pseudostroma and the conidia are acerose. In *Natarajania* the conidiophores are unbranched and verrucose at the upper part and the conidia are ellipsoidal and dark brown. In *Phaeohiratsukaea* the conidiophores are percurrent, conidiogenous cells are mono- to polyphialidic and the conidia are ellipsoidal, brown with a germ slit and formed in chains. The combination of diagnostic characters found in *Jayarambhatia* is not shown by any other genus of phialidic fungi. Moreover, all of the fungi discussed above were isolated from terrestrial litter, whereas *Jayarambhatia* was isolated from mangrove litter from intertidal region.

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